

Azores, Angra, -0.24 ; *Spain*, Bilboa, -0.35 , $+6.02$; *Canada*, Sydney, -0.25 . Higher pressures and lower temperatures are found in the British Isles, Norway, Russia, Sweden, the United States, and Hudson Bay Territory. The most notable changes are: *British Isles*, Sandwick, $+0.16$ in., -5.04 ; *Norway*, Brono, $+0.40$, -2.05 ; *Russia*, Moscow, $+0.44$, -4.01 ; *Sweden*, Haparanda, $+0.44$, $+0.02$; the *United States*, Roseburg, $+0.28$, -7.0 , Pembina and Chicago, -12.0 . *Hudson Bay Territory*, York Factory, $+0.08$, -18.06 . In general, since the preceding month (*December*, 1878), the mean pressure has greatly increased over Europe and the Atlantic ocean east of 30° and south of 40° . The greatest increase of pressure occurred over Norway and Sweden; Haparanda, Hernosand and Stockholm, $+0.56$ in. The most decided diminution was over the northwestern Atlantic, Heart's Content -0.16 ; Stykkisholm, -0.42 and Godthaab, -0.57 .

On chart No. VI are traced the paths of 33 of the principal storm-areas of the northern hemisphere, during the month of *January*, 1880. Of these, four, Nos. IX, XX, XXIV and XXXII, are located along the eastern coast of Asia; seven, Nos. II, XII, XVII, XVIII, XXVIII, XXIX and XXXI, over the Behring's Sea region, and the rest, 22 in number, over the North American and European continents and North Atlantic Ocean. Thirteen of the last first appeared over or in the neighborhood of North America, of which six were already well developed areas when first noticed over Washington Territory or Manitoba. All of the American storms can be traced for some distance off the eastern coast, moving in an easterly or northeasterly track over the western portion of the Atlantic, but it is only possible to carry three, Nos. XI, XVI and XXIII, over to the European coast. Striking similarities occur in the paths of these three storms, notably, the southeasterly paths of areas Nos. XVI and XXIII, from the centre of the ocean to the Mediterranean. Five storms, Nos. I, IV, XIII, XIV and XVI, appear to have originated over the Atlantic, but the development of these is intimately connected with areas of low pressure preceding and to the northwest of their places of origin. All the European storms, with the exception of area No. X, came from the ocean.

The four tracks shown along the eastern coast of Asia are those of unusually well-defined areas, both as regards their extent and their progressive motion. Of the four, the one designated as No. XX was the best marked, and a short description of it will serve to point out the general characteristics of the whole as a class. The following table shows the lowest barometric readings observed, with the time of observation reduced to Washington mean time, and the direction of wind at the time of lowest barometer and at the next preceding and succeeding observations:

STATIONS.	Date.	Washington mean time.	Barometer.	Winds.
	<i>January.</i>	<i>h.m.</i>	<i>Inches.</i>	
Nertschinsk.....	13th	8:43 p. m.	30.21	Calm—Calm—(—)
Pekin.....	15th	7:35 a. m.	30.04	Calm—Calm—NW.
Tientsin.....	14th	7:35 a. m.	29.99	SE—Calm—SSE.
Macao.....	14th	7:35 a. m.	30.05	NE.—ESE.—E.
Shanghai.....	14th	2:46 p. m.	29.94	SE.—S.—S.
Nagasaki.....	14th	7:42 p. m.	29.84	SE.—SSW.—W.
Hiroshima.....	15th	1:52 a. m.	29.71	NE.—(—)—N.
Yokohama.....	15th	7:35 a. m.	29.66	Calm—SW.—WSW.
Tokio.....	15th	5:28 p. m.	29.45	NNW.—NNW.—WNW.
Vladovostok.....	15th	5:04 p. m.	29.94	N.—N.—N.
44° N. 166° E.....	16th	7:35 a. m.	30.07	Variable—S.—S.
Nikolaievsk.....	17th	4:28 p. m.	29.64	NW.—W.—W.

At Peking the barometer on the morning of the 14th read 30.07, and on the 15th was evidently rising rapidly, as on the morning of the 16th the barometer reading was 30.47. The difference in the time of lowest barometer at Yokohama and Tokio is due to the fact that at the former station there is only one daily observation reported. The lowest barometric readings of the month at Tientsin, Shanghai, Nagasaki, Hiroshima, Yokohama, Tokio, Vladovostok, (except 29.90 on the 4th) and Nikolaievsk on the Amoor, occurred during the passage of this area. The average progressive velocity of the centre was about 25 miles per hour, which was probably about the same as that of the other areas.

TEMPERATURE OF THE AIR.

The mean temperatures for September, 1880, are shown by isotherms on chart No. II. East of the Rocky Mountains an excess of temperature has prevailed in New England, Canada, Lower Lake region and Middle States. In the Missouri and Upper Mississippi valleys and Upper Lake region the mean temperature was normal. Elsewhere deficiencies were reported—the greatest in Texas. Westward of the Rocky Mountains the temperature has been normal or above, to the north of parallel 42, while to the south deficiencies have been reported. That at San Diego— 3.06 —being the greatest departure from the normal in the country.

The following extracts relating to the temperature of the month are noted as of interest:

Riley, Ill., mean temperature 2° below average of 19 years; Gardiner, Me., temperature 2.01 above mean of 44 years; Westborough, Mass., mean temperature 7° above that of August; Linden, N. J., no frost during month; Newark, N. J., temperature 5.09 above mean of 37 years; Philadelphia, temperature 6.09 above mean of 91 years; Baltimore, 5th, two fatal sunstrokes.

Maximum Temperatures.—Upon charting the maximum temperatures observed at Signal Service stations during September, 1880, it is found that in general they range from 80° to 96°. Stations reporting temperatures of 100° and above are as follows: Decatur, Wickenburg and Eagle Pass, 100°; Red Bluff, 100.°5; Jacksboro, 101°; Pilot Point, 103°; Phoenix, 105°; Tucson, 106°; Florence, 107°; Yuma, 108°; Burkes, 111°. Stations reporting maxima of 80° or below: Santa Fé, N. M., and St. Vincent, Minn., 80°; Portland, Or., 79°·5; Grand Haven, 79°; Eastport, 78°; Olympia, 73°; Mt. Washington, 65°; Pike's Peak, 46°.

Minimum Temperatures.—Upon charting the minimum temperatures observed at Signal Service stations during September, 1880, it is found that such temperatures exceeding 60° occurred only at Charleston, in Florida and along the immediate coast of the western part of the Gulf of Mexico. The isotherm of 40° passes to the northward of New England, through Lakes Ontario and Erie, westward through central Iowa to Nebraska and thence southward to western Texas. Stations reporting minima below 30° are as follows: Deadwood, Bismarck, Fts. Benton and Custer, 29°; Virginia City, 28°; St. Vincent, Santa Fe and Ft. Stevenson, 27°; Missoula and Breckenridge, 25°; Ft. Buford, 24°; Helena, 23°; Mt. Washington and Winnemucca, 22°; Pike's Peak, 7°. The lowest temperature on the Pacific coast was 34° at Olympia and Dayton.

The following list shows the maximum and minimum temperatures in each State and Territory:

Maximum Temperatures.—*Alabama*: 92° at Mobile and Montgomery. *Arizona*: 111° at Burkes. *Arkansas*: 90° at Little Rock. *California*: 114° at *Indio and *Mammoth Tank and 100° at Red Bluff. *Colorado*: 89° at Denver and 46° on summit of Pikes Peak. *Connecticut*: 92° at *Mystic and 89° at New London. *Dakota*: 97° at *Olivet and 86° at Deadwood. *Delaware*: 90° at Dover. *District of Columbia*: 94° at Washington. *Florida*: 96° at Houston and 94° at Key West. *Georgia*: 94° at *Forsyth and 91° at Augusta. *Iowa*: 90° at *Glenwood and 89° at Keokuk. *Idaho*: 95° at Boise City. *Illinois*: 96° at *Louisville and 86° at Springfield and Cairo. *Indiana*: 94° at Vevay and 89° at Indianapolis. *Indian Territory*: 98° at Fort Gibson. *Kansas*: 98° at *Cedar Vale and *Independence, and 94° at Dodge City. *Kentucky*: 92° at Louisville. *Louisiana*: 92° at Shreveport. *Maine*: 89° at *Orono and 88° at Portland. *Maryland*: 91° at Baltimore. *Massachusetts*: 93° at Boston. *Michigan*: 90° at *Lansing and *Thornville, and 87° at Detroit. *Minnesota*: 90° at St. Paul. *Mississippi*: 91° at Vicksburg. *Missouri*: 92° at *Pierce City and 91° at St. Louis. *Montana*: 92° at Ft. Benton. *Nebraska*: 102° at *Austin and 93° at North Platte. *Nevada*: 104° at *Golconda and 94° at Winnemucca. *New Hampshire*: 86° at *Grafton and 65° on summit of Mt. Washington. *New Jersey*: 94° at Atlantic City. *New Mexico*: 96° at La Mesilla. *New York*: 92° at Rochester and *Boyd's Corner. *North Carolina*: 97° at *Weldon and 94° at Wilmington. *Ohio*: 92° at *Bellefontaine and *Norwalk, and 91° at Cincinnati. *Oregon*: 93° at Umatilla. *Pennsylvania*: 95° at *Egypt and 92° at Pittsburg. *Rhode Island*: 87° at *Newport. *South Carolina*: 89° at Charleston. *Tennessee*: 89° at Memphis. *Texas*: 103° at Pilot Point and 100° at Decatur and Eagle Pass. *Utah*: 88° at Salt Lake City. *Vermont*: 94° at *Charlotte and 90° at Burlington. *Virginia*: 96° at Norfolk. *Washington Territory*: 88° at Dayton. *West Virginia*: 88° at *Flemington and 85° at Morgantown. *Wisconsin*: 88° at *Embarrass and 86° at La Crosse. *Wyoming*: 84° at Cheyenne.

Those marked with a star (*) are reported by U. S. Army Post Surgeons or Voluntary Observers.

Minimum Temperatures.—*Alabama*: 53° at Montgomery. *Arizona*: 47° at Burkes. *Arkansas*: 48° at Little Rock. *California*: 30° at Truckee and 44° at Los Angeles. *Colorado*: 30° at *Hermosa and 7° on summit of Pikes Peak. *Connecticut*: 43° at New Haven. *Dakota*: 20° at *Fort Stevenson and 24° at *Fort Buford. *Delaware*: 52° at Dover. *District of Columbia*: 48° at Washington. *Florida*: 58° at Pensacola. *Georgia*: 47° at Atlanta. *Iowa*: 30° at *Guttenburg and 37° at Dubuque. *Idaho*: 35° at Boise City. *Illinois*: 32° at *Morrison and *Riley, and 40° at Chicago. *Indiana*: 33° at *Spiceland and 41° at Indianapolis. *Indian Territory*: 45° at Ft. Gibson. *Kansas*: 38° at *Wellington and *Yates Centre and 39° at Dodge City. *Kentucky*: 45° at Louisville. *Louisiana*: 53° at Shreveport. *Maine*: 31° at *Onoro and 40° at Eastport. *Maryland*: 40° at *Woodstock and 50° at Baltimore. *Massachusetts*: 32° at *Westborough and 39° at Springfield. *Michigan*: 33° at *Litchfield and 34° at Grand Haven and Port Huron. *Minnesota*: 25° at Breckenridge. *Mississippi*: 52° at Vicksburg. *Missouri*: 35° at *Pierce City and 45° at St. Louis. *Montana*: 23° at Ft. Shaw. *Nebraska*: 30° at *Austin and 34° at North Platte. *Nevada*: 21° at *Palisade and 22° at Winnemucca. *New Hampshire*: 30° at *Auburn and *Grafton and 22° on summit of Mt. Washington. *New Jersey*: 40° at *Dodge Mine and 47° at Atlantic City. *New Mexico*: 27° at Santa Fe. *New York*: 32° at *Waterburg and 40° at Rochester. *North Carolina*: 34° at *Highlands and 48° at Charlotte. *Ohio*: 32° at *Bellefontaine and 38° at Sandusky. *Oregon*: 37° at Roseburg. *Pennsylvania*: 28° at *Franklin and 39° at Pittsburg. *Rhode Island*: 48° at Newport. *South Carolina*: 61° at Charleston. *Tennessee*: 41° at Knoxville. *Texas*: 37° at Elliott and 41° at Davis. *Utah*: 24° at *Coalville and 39° at Salt Lake City. *Vermont*: 31° at *Woodstock and 41° at Burlington. *Virginia*: 36° at Wytheville and 43° at Lynchburg. *Washington Territory*: 34° at Olympia and Dayton. *West Virginia*: 37° at *Flemington and 40° at Morgantown. *Wisconsin*: 26° at Neillsville and 39° at La Crosse. *Wyoming*: 32° at Cheyenne.

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Ranges of Temperature at Signal Service Stations.—The monthly ranges will appear from the *maxima* and *minima* just given. The greatest *daily* ranges vary in New England, from 15° at Block Island to 21° at Eastport and 31° at Burlington; Middle Atlantic States, 16° at Cape May to 26° at Albany and 32° at Lynchburg; South Atlantic States, 10° at Portsmouth to 29° at Augusta; East Gulf States, 15° at Key West to 26° at Montgomery; West Gulf States, 15° at New Orleans to 33° at Corsicana; Ohio Valley and Tennessee, 22° at Cairo to 32° at Knoxville; Lower Lake region, 21° at Erie to 30° at Rochester; Upper Lake region, 24° at Grand Haven to 30° at Alpena and Port Huron; Upper Mississippi valley, 23° at Davenport to 34° at St. Paul; Valley of the Red River of the North, 37° at St. Vincent to 43° at Breckenridge; Lower Missouri valley, 26° at Omaha to 40° at Yankton and 41° at Bismarck; Rio Grand valley, 22° at Brownsville to 31° at Stockton and 32° at Rio Grand City; Texas, 28° at Fort McKavett to 32° at Uvalde and 38° at Pilot Point; Rocky Mountain region, 25° at Pike's Peak to 42° at Denver; Western Plateau district, 33° at Salt Lake City to 54° at Winnemucca; Southern Plateau district, 33° at Tucson to 45° at Wickenburg; California, 23° at San Francisco to 39° at Los Angeles and 40° at Visalia; Oregon, 28° at Portland to 43° at Dayton.

Frost.—The dates of first frosts are shown below. General and killing frosts have not been reported extensively. They first occurred at scattered stations in the various States as follows: Iowa and Wisconsin, 8th and 9th; Nebraska, 13th; Maine, Massachusetts, New Hampshire and Pennsylvania, 24th; Michigan, New York and Ohio, 30th. *Connecticut*: Southington, 30th. *Georgia*: Gainesville, 30th. *Illinois*: General in northern half of State on 4th and 5th, and throughout State from the 27th to the 30th. *Indiana*: New Corydon, 14th, 15th, 30th; Vevay, 14th, 29th, 30th; Wabash, 10th, 14th, 15th, 22nd, 23rd. *Iowa*: General between the 8th and 10th, 13th, 14th and 26th to 30th; Kansas: Holton, Lawrence and Yates Centre, between 9th and 13th, and 27th to 29th; Topeka and Wallington, 27th. *Maine*: Cornish, 23rd, 24th; Gardiner, 24th. *Maryland*: Deer Park, 10th, 14th, 15th, 29th, 30th. *Massachusetts*: Springfield, 11th; Fall River, Mendon, Rowe, Springfield, Westborough, Williamstown and Milton, 23rd and 24th; Milton and Westborough, 30th. *Michigan*: Niles, 9th, 19th; Kalamazoo and Litchfield, 14th; Marquette, 8th; general, 22nd to 30th. *Missouri*: Ashland and Oregon, 9th, 13th or 14th and between 27th and 30th. *Montana*: Virginia City, 1st. *Nebraska*: All stations, 13th, 20th, 29th. *New Hampshire*: General, 23rd, 24th, 30th. *New Jersey*: Phillipsburg, 11th, 15th, 23rd, 24th, 29th, 30th. *New York*: Waterburgh, 11th; Palermo, 15th; Flushing, Palermo and Waterburgh, 24th; Dundee and White Plains, 30th. *North Carolina*: Highlands and Murphy, 10th; Franklin, 30th. *Ohio*: Bellefontaine and North Lewisburg, 10th; Bethel, College Hill and Norwalk, 14th or 15th; general on the 30th. *Pennsylvania*: Dyberry, 11th, 12th; Catawissa, 15th; frequent in State, 23rd, 24th, 29th, 30th; near Philadelphia, 15th. *Tennessee*: Ashwood, 14th, 30th; McMinnville, 30th. *Utah*: Coalville, 1st, 12th, 25th, 26th; Utah, 12th and from 19th. *Vermont*: Lunenburg and Windsor, 24th. *Virginia*: Wytheville, 15th, 29th. *West Virginia*: Flemmington, 30th. *Wisconsin*: Frequent in northern part of State from 8th to 10th, 13th to 15th; general from 27th to 30th. *Wyoming*: Cheyenne, 12th.

Ice.—*Idaho*: Boise City, 25th, 26th, $\frac{1}{2}$ inch thick. *Iowa*: Fort Madison, 9th; Cresco, 8th. *Michigan*: Hudson, 24th, $\frac{1}{2}$ inch; Lansing, 29th. *Minnesota*: St. Vincent, 7th. *Missouri*: Forest City, 27th, 29th. *Montana*: Ft. Custer, 20th. *Nebraska*: Austin, 13th, 29th. *New Hampshire*: Grafton, 23rd; Mt. Washington, 8th. *Nevada*: Winnemucca, 19th, 27th. *Utah*: Coalville, 1st, 25th, 26th; Deep Creek, 23rd, $\frac{1}{2}$ in. *Wisconsin*: Embarras and Bloomfield, 21st, 30th. *Wyoming*: Cheyenne, 12th.

PRECIPITATION.

The general distribution of rain-fall, for September, 1880, is shown on chart No. III, as accurately as possible, from about 500 reports. The table on this chart shows the *average* precipitation for September, as compared with that of the present month. The rainfall has been normal in New England, the Ohio, Lower Missouri, Upper Mississippi and St. Lawrence valleys. Elsewhere deficiencies have occurred, except in the Gulf States, from which latter districts, excesses ranging from 1.36 in the eastern to 4.24 inches in the western half, are reported. In central Texas, the rainfall was unusually large, causing local floods, which are elsewhere noticed. The rainfall was greatly deficient (over 3 inches) in Florida and the South Atlantic States. Less important deficiencies are noted in the Lake region, Upper Missouri valley, Minnesota and on the entire Pacific coast.

Special Heavy Rains.—1st, Vicksburg, 5.24 inches; Dover Mines, Va., 2.30 in. in 5 hours, 15 minutes; Portsmouth, N. C., 1.28 in. in 30 minutes. 2nd, Fayette, Miss., 2.60 in. in 13 hours, 25 minutes. 2nd and 3rd, Highlands, N. C., 5.58 in. 3rd, Fort Barrancas, Fla., 2.06; Ft. Davis, Tex., 2.19 in 1 hour, 9 minutes. 3rd and 4th, Galveston, Tex., 3.44 in. 4th, Fort Barrancas, Fla., 3.15 in. in 15 hours, 15 minutes; Fredericksburg, Tex., 2.01. 6th, Dover Mines, Va., 0.90 in. in 35 minutes. 7th, Shreveport, 2.11 in.; Pensacola, 3.70 in.; Fayette, Miss., 2.90 in. in 12 hours, 25 minutes; Indianola, Tex., 1.27 in. in 25 minutes. 9th, Portsmouth, N. C., 3.40 in.; Daytona, Fla., 2.98 in. in 4 hours; Ft. Davis, Tex., 2.42 in. in 45 minutes. 10th, Mt. Washington, 2.33 in.; Mayport, 2.10 in. in 11 hours, 15 minutes; Thatcher's Island, Mass., 2.78 in. 12th, Shreveport, 2.84 in. 13th, Eagle Pass, 3.50 in. in 12 hours. 13th and 14th, Ft. Davis, Tex., 2.77 in., of which 2.30 in. fell in 15 hours. 15th, Mt. Washington, 7.41 in.; Fredericksburg, Tex., 2.62 in. 18th, Neillsville, Wis., 3.90 in. in 11 hours, 10 minutes. 18th and 19th, Clinton, Ia., 3.15 in. in 33 hours. 19th, Muscatine, Ia., 0.16 in.